In The Claims

1. *(currently amended):* A method of forming uniform metal nitrides (MN) comprising ~~contacting heated metal with flowing iodine (I_2) vapor, at pressures below 760 Torr, to form a metal iodide (MI) and then flowing said MI into contact with ammonia, at pressures below 760 Torr, to form said MN~~, heating iodine solids to generate iodine vapor (I_2), heating metal downstream of said iodine, flowing said I_2 downstream to contact said heated metal to form a metal iodide (MI) vapor and flowing said vapor downstream into contact with ammonia (NH_3) at pressures below 760 Torr to form metal nitride vapor and depositing same on a substrate to form said MN, wherein the heat applied to said iodine solids and the heat applied to said metal are adjusted to vary and control the properties of said MN.
2. *(original):* The method of claim 1 conducted in a reactor wherein the reactor pressure is maintained between 750 and 75 Torr.
3. *(original):* The method of claim 1 wherein said reduced pressures are between 600-100 Torr.
4. *(original):* The method of claim 1 wherein said reduced pressures are between 100-5 Torr.
5. *(original):* The method of claim 1 wherein said M is gallium, aluminum, indium or alloys thereof.
6. *(original):* The method of claim 1 wherein said MN is gallium nitride (GaN), aluminum nitride (AlN), indium nitride (InN) and ternary and quaternary nitrides such as gallium aluminum nitride (GaAlN), gallium arsenic nitride (GaAsN),

gallium aluminum indium nitride (GaAlInN) or gallium arsenic indium nitride (GaAsInN).

7. *(currently amended):* The method of claim 1 wherein a carrier gas is employed for said I_2 and said MI is formed in one locale and then is flowed to another locale to react with ammonia to form said MN.

8. *(previously presented):* The method of claim 1 wherein said MN is formed as a vapor and deposited on a seed or self-nucleates on a nearby surface.

9. *(previously presented):* The method of claim 1 wherein

   a) iodine is placed in a first boat upstream in an elongated first container below an inlet for H_2,

   b) metal is placed in a second boat located downstream of said first boat in said first container, with an outlet thereof being positioned downstream of said second boat,

   c) heating said second boat to heat the metal therein,

   d) heating said first boat to cause iodine vapor to flow downstream to contact said metal to form MI vapor,

   e) flowing said MI vapor out said outlet and

   f) contacting said MI vapor with said ammonia to form said MN.

10. *(original):* The method of claim 9 wherein a substrate is positioned proximate said outlet in a substrate zone and said MN is deposited on said substrate.

11. *(original):* The method of claim 10 wherein MN formation is conducted at 750-3 Torr in said substrate zone.

12. *(original):* The method of claim 9 wherein the outlet of said first container projects into or near a second container having ammonia therein and flowing said MI into said second container to contact said ammonia and form an MN vapor for deposit on a substrate, on one or more seeds or to self-nucleate on the interior surfaces of said second container.

14 ~~13.~~ *(previously presented):* The method of claim 1 wherein said MI is formed by the reaction:

$$I_2 + 2\,M \rightarrow 2\,MI$$

15 ~~14.~~ *(original):* The method of claim 1 wherein said MN is formed by the reaction;

$$MI + 4\,NH_3 \rightarrow MN + 4\,H_2 + N_2 + NH_4I$$

15. *(withdrawn):* A reactor for forming a metal nitride (MN) comprising,

a) a first container,

b) said container having an upstream inlet, followed by a first boat for iodine (I_2), a second boat for M spaced downstream from said first boat and an outlet located downstream from said second boat,

c) means to reduce the pressure in said container to below 760 Torr,

d) means for heating the two boats,

e) means for flowing iodine vapor from said first boat or for flowing hydrogen iodide (HI) from said inlet downstream to said second boat to contact said M to form metal iodide (MI) vapor and for flowing said MI vapor out said outlet and

f) means to contact the outlet MI vapor with ammonia to form said MN.

16. *(withdrawn):* The reactor of claim 15 having a substrate positioned proximate said outlet and means to deposit said MN vapor on said substrate as a film or layer.

17. *(withdrawn):* The reactor of claim 15 wherein the outlet of said first container extends into a proximate second container which holds ammonia and means for flowing said MI vapor into said second container to form MN vapor and to deposit said MN vapor on a substrate or on one or more seeds or to self-nucleate on the walls of said second container, and vacuum pump means being applied to said second container, downstream of the depositing MN vapor.

18. *(withdrawn):* The reactor of claim 17 wherein a substrate is mounted in said second container proximate said outlet for deposit of said MN thereon.

19 *(withdrawn):* The reactor of claim 17 wherein said first and second containers are elongated.

13 ~~20~~ *(new):* The method of claim 9 wherein said first boat is heated to vary the vapor pressure of I_2 and the second boat is heated to vary the formation rate of MI to control the quality and quantity of the deposited MN.

REMARKS

Claims 1-19 and new claim 20 are in the present application. Claims 1 & 7 have been amended as indicated. These claims and new claim 20, find support in the specification on pages 4, 5 & 7 and in Figure 1 and no new matter has been added.

As requested by the above Office Action, the above non-elected claims 15-19 are cancelled without prejudice to re-filing of same.

The Office Action rejection of claims 1-8 & 13, 14, as obvious under 35 USC 103 (a) over Vaudo et al ('581) in view of Hirota et al ('299 A 2), is respectfully traversed.

Vaudo et al teach a one boat method in which a halide vapor is flowed over a molten metal in such boat to form a metal halide which then is flowed into contact with ammonia in a deposition zone to form MN with little control over the MN formation rate